

# PATENT ABSTRACTS OF JAPAN

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## (54) ZOOM LENS, CAMERA AND PERSONAL DIGITAL ASSISTANCE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a zoom lens which is small and bright, uses fewer lenses, and is a low cost though the zoom lens allows a wide angle of view and to provide a camera and a personal digital assistance which use the zoom lens.

**SOLUTION:** The zoom lens includes, in order from an object side, a first lens group G1 which has a positive focal distance and is movable, a second lens group G2 which has a negative focal distance and is movable, a third lens group G3 which has a positive focal distance and is movable, and a fourth lens group G4 which has a positive focal distance. The zoom lens also includes a diaphragm on the object side of the third lens group G3. To vary magnification from a short focus end to a long focus end, the first to fourth lens groups G1 to G4 move such that an interval between the first lens group G1 and the second lens group G2 increases, an interval between the second lens group G2 and the third lens group G3 decreases, and an interval between the third lens group G3 and the fourth lens group G4 increases. When  $f_i$  is the focal distance ( $i=1$  to 3) of the  $i$  lens group, the following conditional formula is satisfied:  $0.3 < |f_2|/f_3 < 0.5$  or  $0.3 < |f_2|/f_3 < 0.4$ .

